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AIR PILLOW WITH FOUR ADJUSTABLE
AIR PRESSURE CHAMBERS

20 Background of the Invention

(1) Field of the Invention.

The present invention pertains to an air inflatable pillow that is designed to comfortably cradle the head and neck of a user whether the user is lying on their back or on their side. More specifically, the present invention 25 pertains to an inflatable pillow having four separate air pressure adjustable compartments. Two of the compartments are specifically configured to support the head and neck (cervical spine) of a user when lying on their back. The remaining two compartments are specifically configured to support the head and neck of a user when lying on either side.

(2) Description of the Related Art

There exists in the prior art many different examples of pillows that have been specifically designed to provide comfort and therapeutic care for users of the pillows. Many different types of pillows have been designed 5 aiming to reduce or correct neck and upper back discomfort of users while they sleep. These pillows are constructed in a variety of shapes and contours and from a variety of different materials.

More recently, therapeutic pillows have been designed with contours and dimensions that are specifically matched to an individual. The individual's 10 head and neck dimensions are employed in designing the supporting surface of the pillow. These types of pillows are constructed of a foam or similar material that has a top surface contour that cradles the back of the head of the individual as well as the back of the neck of the individual. The resilient foam or other similar material of the pillow and the configuration of the pillow 15 top surface are intended to provide comfort and therapeutic care to the individual user.

However, the individualized pillow constructions of the prior art described above are disadvantaged in that the resilience or firmness of the pillow is set when the pillow is initially designed for the individual user. Should 20 the individual user's preference for a firm pillow or a soft pillow change, it is necessary to construct a new pillow to suit the individual's preference for the firmer or softer pillow. In addition, these prior art pillows are designed for an individual that predominantly sleeps on their back. However, many individuals change their sleeping positions several times during a full night's sleep. Prior

art pillows that are specifically designed to cradle the back of the user's head and neck are not as comfortable, and can often be very uncomfortable when the pillow is used to support the side of the individual's head when the individual rolls over to sleep on their side.

5 What is needed to overcome these disadvantages of prior art therapeutic pillows is a pillow that can adjust to anatomical needs having a firmness or softness that can be changed as the individual user's preference for a firm pillow or soft pillow changes. In addition, the pillow would provide therapeutic support to the user's head and neck whether the user is sleeping

10 on their back or on their side.

Summary of the Invention

 The pillow of the present invention overcomes the disadvantages associated with prior art therapeutic pillows. The pillow of the invention is

15 designed as an inflatable pillow with four separate compartments enclosing interior volume sections. The separate compartments are designed to support and cradle the back of the user's head and the back of the user's neck when the user is sleeping on their back, and to support the side of the user's head when the user is sleeping on their left side or right side.

20 Individually sealed forward and rearward inflatable pillow compartments support the respective neck and head of the user when the user is sleeping on their back. Individually sealed left side and right side inflatable pillow compartments support the respective left side of the individual's head and

neck and the right side of the individuals' head and neck when the individual is sleeping on either side.

The forward pillow compartment contains a forward section of the pillow interior volume that is sealed from the remainder of the pillow interior 5 volume. This enables the forward section of the pillow interior volume to be adjustably inflated to a desired air pressure that provides the firmness or softness of the pillow preferred by the individual. In addition, the forward compartment of the pillow is constructed with a height dimension that positions a top surface of the forward compartment beneath the individual's 10 neck, providing support for the neck when the individual is sleeping on their back.

The rearward pillow compartment contains a rearward section of the pillow interior volume that is sealed from the remainder of the pillow interior volume. This enables the rearward pillow compartment to be adjustably 15 inflated to provide the level of firmness or softness preferred by the pillow user. In addition, the rearward pillow compartment is constructed with a height dimension that positions a top surface of the rearward pillow compartment at a lesser elevation than the top surface of the forward pillow compartment. This enables the top surface of the rearward pillow 20 compartment to support the user's head at a slightly lesser elevation than the top surface of the forward pillow compartment supporting the user's neck when the user is lying on their back.

The left side and right side compartments of the inflatable pillow contain respective left side and right side sections of the pillow interior

volume. The left and right side sections of the pillow interior volume are sealed from the forward and rearward sections of the interior volume, but communicate with each other. This enables the air pressure in the left side and right side sections of the pillow interior volume to be adjusted to provide

5 the respective left and right compartments of the pillow with the firmness or softness desired by the individual user. In addition, the left and right side compartments of the pillow are constructed with their top surfaces elevated slightly above the top surface of the rearward pillow compartment. This dimensioning of the left and right side compartments of the pillow enables the

10 compartments to comfortably support the respective left and right sides of the user's head and neck when the user is sleeping on either their left or right side.

Thus, the pillow of the present invention provides separate air adjustable compartments that can provide the desired firmness or softness of

15 the individual user. In addition, the dimensioning of the pillow's separate compartments enable it to comfortably support the head and neck of the user when the user is sleeping on their back, and support the opposite left side and right side of the user's head when the user is sleeping on their respective left side or right side.

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Detailed Descriptions of the Drawings

Further features of the present invention are set forth in the following detailed description of the preferred embodiment of the invention and in the drawing figures wherein:

Figure 1 is a plan view of the air inflatable pillow of the invention;

Figure 2 is a schematic representation of a front, elevation view of the pillow of Figure 1;

Figure 3 is a schematic representation of a rear, elevation view of the
5 pillow of Figure 1;

Figure 4 is a schematic representation of a front, perspective view of the pillow of Figure 1; and,

Figure 5 is a schematic representation of a rear, perspective view of the pillow of Figure 1.

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Detailed Description of the Preferred Embodiment

A plan view of the air inflatable pillow 12 of the invention is shown in Figure 1. Figure 1 shows the top of the air inflatable pillow 12. Preferably, the air pillow 12 is constructed in a similar manner to that of the air cell pillow of
15 U.S. Patent No. 6,189,168 B1, which issued on February 20, 2001, and is incorporated herein by reference. The pillow 12 is basically comprised of a bottom, base sheet 14 and a top sheet 16. Both the base sheet 14 and top sheet 16 are constructed of a flexible air impervious material, for example vinyl or plastic. The base sheet 14 and top sheet 16 have coincident
20 peripheral edges 18 that are securely sealed together by radio frequency (RF) welding or other equivalent means. This seals an interior volume 22 of the air pillow between the base sheet 14 and top sheet 16.

The bottom, base sheet 14 is generally flat. However, as a variant embodiment of the air pillow, the base sheet 14 could be formed with a

plurality of air cells in the same manner as the top sheet 16, which is described below.

The top sheet 16 is formed with a plurality of air cells that project upwardly from a plane of the top sheet defined by the top sheet peripheral edge 18. The air cells are formed by being molded into the top sheet or by other equivalent methods. The air cells are arranged in three groups. The air cells of each of the three groups have the same basic construction, with only the dimensions of the air cells of the groups being different.

The plurality of air cells includes a first forward group of air cells 26 arranged in a line across the front of the pillow 12 at the middle of the pillow. In the illustrative embodiment, the first group of air cells 26 includes three air cells. Each of the air cells 26 of the first group has a top wall surface 28 and four side wall surfaces 32 that give the air cell a cubic configuration when inflated. The top sheet 16 is secured to the bottom sheet 14 along the bottom edges of each of the air cell side walls 32 forming sealed seams along the bottom edges. The sealed seams extend completely around each air cell 26 except for short, narrow portions 34 of the top sheet that are not sealed to the bottom sheet. These narrow portions 34 form conduits that intercommunicate the adjacent air cells 26 of the first group. Long, narrow portions of the top sheet and bottom sheet are also left unsecured to each other, forming a first inflation conduit 36 that extends between the top sheet 16 and bottom sheet 14 from the air cells 26 of the first group to the peripheral edges 18 of the sheets.

A first valve 38 is secured on the top sheet 16 at the peripheral edge 18 and communicates with the first inflation conduit 36. The first valve 38 can be any known type of valve that can be used to selectively supply air pressure through the conduit 36 to the air cells 26 of the first group to inflate the air 5 cells, and can be selectively opened to deflate the air cells.

The air cells 26 of the first, forward group of air cells together define a forward compartment of the air pillow. The forward compartment encloses a forward section of the interior volume of the air pillow. This forward section of the pillow interior volume is isolated from other sections of the pillow interior 10 volume, as will be explained.

The top surface area of the air pillow is defined by the top wall surfaces of all of the air cells. The top wall surfaces 28 of the air cells 26 of the first group together define a forward surface area portion of the air pillow top surface. The side walls 32 of each of the air cells 26 of the first group have 15 the same dimensions and position the top wall surfaces 28 of the air cells 26 at generally the same positions elevated above the plane defined by the base sheet and top sheet peripheral edges 18. With the air cells of the first group 26 fully inflated, the top wall surfaces 28 of the first group of air cells 26 are positioned at generally a first elevation above the plane defined by the sheet 20 peripheral edges 18. By adjusting the air pressure in the first group of air cells 26, the elevation of the air cell top wall surfaces 28 above the plane defined by the base sheet and top sheet peripheral edges 18 can be adjusted. In addition, by adjusting the air pressure in the first group of air cells 26, the firmness or softness of the air cells can be adjusted.

The plurality of air cells includes a second group of air cells 46 that is separate from the first group of air cells 26. The second group of air cells 46 is arranged in two lines at the back of the pillow behind the first group of air cells 26 and at the middle of the pillow. In the illustrative embodiment, the air 5 cells of the second group 46 include six separate air cells. Like the air cells of the first group, each of the air cells 46 of the second group has a top wall surface 48 and four side wall surfaces 52 that give the air cells a cubic configuration when inflated. Again, like the air cells of the first group 26, the top sheet 16 is secured to the bottom sheet 14 along the bottom edges of 10 each of the air cell side walls 52 forming sealed seams along the bottom edges of the air cells 46. The sealed seams extend completely around each of the air cells 46 except for short, narrow portions 54 of the top sheet that are not secured to the bottom sheet. These narrow portions 54 form conduits that 15 interconnect the adjacent air cells 46 of the second group. Long, narrow portions of the top sheet and bottom sheet are also left unsecured to each other, forming a second inflation conduit 56 that extends between the top sheet 16 and bottom sheet 14 from the air cells 46 of the second group to the peripheral edges 18 of the sheets.

A second valve 58 is secured on the top sheet 16 at the peripheral 20 edge 18 and communicates with the second inflation conduit 56. The second valve 58 can be any known type of valve that can be used to selectively supply air pressure through the second inflation conduit 56 to the air cells 46 of the second group to inflate the air cells, and can be selectively opened to deflate the air cells.

The air cells 46 of the second, rearward group of air cells together define a rearward compartment of the air pillow. The rearward compartment encloses a rearward section of the interior volume of the air pillow. This rearward section of the air pillow interior volume is isolated from the other 5 sections of the pillow interior volume.

The top wall surfaces 48 of the air cells 46 of the second group together define a rearward surface area portion of the total top surface area of the air pillow. The side walls 52 of the second group of air cells 46 have the same dimensions and position the top wall surfaces 48 of the second group of 10 air cells 46 at generally the same elevation above the plane defined by the sheet peripheral edges 18. With the air cells of the second group 46 fully inflated, the air cell top wall surfaces 48 are positioned generally at a second elevation above the plane defined by the base sheet and top sheet peripheral edges 18. The second elevation of the air cells of the second group 46 is less 15 than the first elevation of the air cells of the first group 26, as can be seen in the schematic representations of the air cells shown in Figures 2-5. By adjusting the air pressure in the air cells of the second group 46, the second elevation of the top wall surfaces 48 of the second group of air cells can be adjusted. In addition, by adjusting the air pressure in the air cells of the 20 second group 46, the firmness or softness of the air cells can be adjusted.

The plurality of air cells include a third group of air cells 66 that are positioned at the left side and right side of the pillow. Like the air cells of the first group 36 and second group 46, each of the air cells 66 of the third group has a top wall surface 68 and four side wall surfaces 72 that give the air cell a

cubic configuration when inflated. The top sheet 16 is secured to the bottom sheet 14 along the bottom edges of each of the air cell side walls 72 forming sealed seams along the bottom edges. The sealed seams extend completely around each air cell 66 except for short, narrow portions 74 of the top sheet

5 that are not sealed to the bottom sheet. These narrow portions 74 form conduits that intercommunicate the adjacent air cells 66 of the third group. Long, narrow portions of the top sheet and bottom sheet are also left unsecured to each other, forming a third inflation conduit 76 that extends between the air cells of the third group 66 on the left side of the pillow and the

10 right side of the pillow as shown in Figure 1. An additional third inflation conduit 78 extends between the base sheet 14 and top sheet 16 from the third group of air cells 66 on the left side of the pillow as viewed in Figure 1, to a third valve 82 positioned at the peripheral edge of the pillow. The third valve 82 can be any known type of valve that can be used to selectively supply air

15 through the third inflation conduits 78, 76 to the air cells 66 of the third group to inflate the air cells, and can be selectively opened to deflate the air cells.

The air cells 66 of the third group together define a left side compartment and a right side compartment of the air pillow. The left side compartment and right side compartment intercommunicate with each other

20 through the third inflation conduit 76. The left side compartment and right side compartment enclose respective left and right side sections of the interior volume of the air pillow. The left and right side sections of the pillow interior volume are isolated from the forward and rearward sections of the pillow interior volume.

The top wall surfaces 68 of the air cells 66 of the third group together define a left side surface area portion and a right side surface area portion of the total top surface area of the pillow. The side walls 72 of the air cells of the third group 66 have the same dimensions. When the air cells of the third group 66 are fully inflated, the dimensions of the air cell side walls 72 position the top wall surfaces 68 of the air cells at generally the same elevation above the plane defined by the base sheet and top sheet peripheral edges 18. This third elevation of the top wall surfaces 68 of the air cells of the third group 66 is elevated above the first elevation of the top wall surfaces 28 of the air cells 26 of the first group and is elevated above the second elevation of the top wall surfaces 48 of the air cells 46 of the second group. By adjusting the air pressure in the air cells 66 of the third group, the third elevation of the air cell top wall surfaces 68 can be adjusted. In addition, adjusting the air pressure in the air cells 66 of the third group adjusts the firmness or softness of the air cells.

The sealed forward pillow compartment defined by the air cells 26 of the first group and the sealed rearward pillow compartment defined by the air cells 46 of the second group support the respective neck and head of the user when the user is sleeping on their back. The left side pillow compartment defined by the air cells 66 of the third group on the left side of the pillow and the right side pillow compartment defined by the air cells 66 of the third group on the right side of the pillow support the respective left side of the individual's head and neck and the right side of the individual's head and neck when the individual is sleeping on either side.

The forward pillow compartment defined by the air cells 26 of the first group contains a forward section of the pillow interior volume that is sealed from the remainder of the pillow interior volume. This enables the forward section of the pillow interior volume to be adjustably inflated to a desired air pressure that provides the firmness or softness of the pillow preferred by the individual. In addition, the forward compartment of the pillow defined by the air cells 26 of the first group can be adjustably inflated through the first valve 38 to adjust an elevation position of the top wall surfaces 28 of the forward compartment beneath the individual's neck, providing support for the neck when the individual is sleeping on their back.

The rearward pillow compartment defined by the air cells 46 of the second group contains a rearward section of the pillow interior volume that is sealed from the other pillow compartments. This enables the rearward pillow compartment to be adjustably inflated to provide the level of firmness or softness preferred by the pillow user. In addition, the rearward pillow compartment defined by the air cells 46 of the second group has a height dimensioned that positions the top wall surfaces 48 of the rearward pillow compartment at a lesser elevation than the top wall surfaces 28 of the forward pillow compartment. This enables the top surface of the rearward pillow compartment to support the user's head at a slightly lesser elevation than the top surface of the forward pillow compartment supporting the user's neck when the user is lying on their back.

The left side and right side pillow compartment's defined by the air cells 66 of the third group on the respective left side and right side of the pillow

contain respective left side and right side sections of the pillow interior volume. The left side and right sections of the pillow interior volume are sealed from the forward and rearward sections of the interior volume, but communicate with each other through their adjacent conduits 74 and the third 5 inflation conduit 76. This enables the air pressure in the left side and right side sections of the pillow interior volume to be adjusted to provide the respective left and right compartments of the pillow with the firmness or softness desired by the individual user. In addition, the left and right side compartments of the pillow defined by the air cells 66 of the third group on the 10 left side and right side of the pillow are constructed with their top wall surfaces 68 elevated slightly above the top wall surfaces 48 of the rearward pillow compartment defined by the air cells 46 of the second group. This dimensioning of the left and right side compartments of the pillow enables the compartments to comfortably support the respective left and right sides of the 15 user's head when the user is sleeping on either their left side or right side.

Thus, the pillow of the present invention provides separate air adjustable compartments that can provide the desired firmness or softness of the individual user. In addition, the dimensioning of the pillow's separate compartments enable it to comfortably support the head and neck of the user 20 when the user is sleeping on their back, and support the opposite left side and right side of the user's head when the user is sleeping on their respective left or right sides.

Although the air pillow of the invention has been described above by reference to a specific embodiment, it should be understood that other

variations and modifications could be made to the air pillow without departing from the intended scope of the invention defined by the following claims.